

Claims

What is Claimed is:

1. An isolated nucleic acid sequence encoding 1-deoxy-D-xylulose 5-phosphate reductoisomerase from a eukaryotic source.
2. An isolated nucleic acid sequence of Claim 1, wherein said nucleic acid sequence is isolated from a plant source.
3. An isolated nucleic acid sequence of Claim 2, wherein said nucleic acid sequence is isolated from *Arabidopsis*.
4. An isolated polynucleotide selected from the group consisting of:
 - a) an isolated polynucleotide comprising a nucleotide sequence encoding the polypeptide of SEQ ID NO: 2 ;
 - b) an isolated polynucleotide comprising SEQ ID NO: 1 ;
 - c) an isolated polynucleotide comprising a nucleotide sequence which has at least 70% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;
 - d) an isolated polynucleotide comprising a nucleotide sequence which has at least 80% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;
 - e) an isolated polynucleotide comprising a nucleotide sequence which has at least 90% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;
 - f) an isolated polynucleotide comprising a nucleotide sequence which has at least 95% identity to that of SEQ ID NO: 1 over the entire length of SEQ ID NO: 1;
 - g) an isolated polynucleotide that hybridizes, under stringent conditions, to SEQ ID NO: 1 or a fragment thereof; and
 - h) an isolated polynucleotide complementary to the polynucleotide sequence of (a), (b), (c), (d), (e), (f), or (g).
5. A DNA construct, comprising; as operably associated components in the 5' to 3' direction of transcription, a promoter functional in a plant cell, a nucleic acid sequence encoding 1-deoxy-D-xylulose 5-phosphate reductoisomerase, and a transcriptional termination sequence.
6. The DNA construct according to Claim 5, wherein said nucleic acid sequence is isolated from a eukaryotic source.

7. The DNA construct according to Claim 5, wherein said nucleic acid sequence is isolated from a plant source.

8. The DNA construct according to Claim 5, wherein said nucleic acid sequence is isolated from *Arabidopsis*.

9. A host cell comprising the construct of Claim 5.

10. A host cell according to Claim 9, wherein the host cell is a plant cell.

11. A plant comprising a cell according to Claim 10.

12. A method for the alteration of the isoprenoid content in a plant, comprising; transforming said host plant with a construct comprising as operably linked components, a transcriptional initiation region functional in a plant, a nucleic acid sequence encoding 1-deoxy-D-xylulose 5-phosphate reductoisomerase, and a transcriptional termination region.

13. A method for the alteration of the isoprenoid content in a plant according to Claim 12, wherein said nucleic acid sequence is in the sense orientation

14. A method according to Claim 13, wherein the isoprenoid content is increased.

15. A method for the alteration of the isoprenoid content in a plant according to Claim 12, wherein said nucleic acid sequence is in the antisense orientation

16. A method according to Claim 15, wherein the isoprenoid content is decreased.

17. A method for producing an isoprenoid compound of interest in a plant cell, said method comprising obtaining a transformed plant, said plant having and expressing in its genome:

a primary construct comprising a DNA sequence encoding 1-deoxy-D-xylulose 5-phosphate reductoisomerase operably linked to a transcriptional initiation region functional in a plant cell; and,

at least one secondary construct comprising a DNA sequence encoding a protein involved in the production of a particular isoprenoid operably linked to a transcriptional initiation region functional in a plant cell.

18. A method according to Claim 17, wherein said protein is involved in the production of isoprenoids selected from the group consisting of tocopherols, carotenoids, monoterpenes, diterpenes, and plastoquinones.

14. A method for increasing the non-mevalonate isoprenoid biosynthetic flux in cell from a host plant, said method comprising transforming said host plant with a construct comprising as operably linked components, a transcriptional initiation region functional in a plant, a DNA coding 1-deoxy-D-xylulose 5-phosphate reductoisomerase, and a transcriptional termination region.

10. A method for modulating disease resistance in a plant, comprising:

growing a plant which contains in its genome a construct which provides for expression of a 1-deoxy-D-xylulose 5-phosphate reductoisomerase gene.